Trautonium memories

Final Draft

Myles W. Jackson: Broadcasting fidelity. German radio and the rise of early electronic music. Princeton: Princeton University Press, 2024, xiii + 340 pp, $45.00 HB

Elektrische Musik is the title of a work published in 1930 by sound engineer Friedrich Trautwein (1888–1956), the father of the Trautonium, a protosynthesizer belonging to what is now referred to as electronic or electroacoustic music (Brilmayer 2017, 7–24).

Broadcasting Fidelity by Myles W. Jackson, currently Albers-Schönberg Profes- sor in the History of Science at the Institute for Advanced Study in Princeton, is dedi- cated to the creation and evolution of this instrument, from the original Trautonium of June 1930 to the Mixtur-Trautonium of 1951. Jackson has explored fields such as optics (2000), biology (2015), and music (2006; Hui et al. 2013), primarily in German-speaking regions (except in 2015), consistently adopting a broad epistemologi- cal perspective on innovation. *Broadcasting Fidelity* follows this approach: the book "explores the collaborations between physicists, electrical engineers, physiologists, and musicians that led to improving the fidelity of early German radio broadcasts during the 1920s and 1930s and inventing an early electronic musical instrument, the Trautonium" (Jackson 2024). This perspective is broader than that of other works or sections of books dedicated to the Trautonium from the early 21st century (Don- hauser 2007; Patteson 2016; Brilmayer 2017; De Wilde 2019).

The first five chapters detail the conditions and circumstances surrounding the birth of the Trautonium, a Berlin-born child of German radio broadcasting during the Weimar Republic (Chap. 1). The instrument was completed within a research and development facility hosted by the Berlin Academy of Music, which had been estab- lished in May 1928 and was co-funded by the Prussian Ministry of Culture (two- thirds) and the local radio company Funkstunde Berlin (one-third). This facility was connected to the Heinrich Hertz Institute for Oscillations (HHI) and supported by three industry players: AEG, Siemens & Halske, and Telefunken. The Rundfunkver- suchsstelle (RVS – Radio Broadcasting Experimental Station, Chap. 4) addressed local problems in radio signal fidelity, from capture to transmission and reception. The general issues are presented in Chap. 2, with the solutions covered in Chap. 3. The focus narrows in Chap. 5 to the new instrument produced in 1930 using radio components.

The first analog subtractive synthesis machine, based on a glow-discharge neon tube oscillator generating sawtooth waves, allowed Trautwein to attempt to incorpo- rate the theories of Hermann von Helmholtz, revised by Carl Stumpf and—errone- ously—by Ludimar Herrmann in phonetics. Particular attention was paid to timbre (tone color) and the concept of the acoustical envelope: "It seems that the Trautonium is the earliest instrument built with the acoustical envelope in mind" (126). The Trau- tonium could imitate acoustic instruments and produce new sounds, whether voice- like or not. It was played via a keyboard (one 'manual', and later two) comprising a metal strip (resistance strip) and a wire sensitive to pressure, with manual controls for filters and amplifiers, and a volume pedal.

A young musician, Oskar Sala (1910–2002), a student of Hindemith, participated in the Trautonium's construction and became its virtuoso. He acquired the scientific and technical

knowledge to advance the instrument and devoted his life to it, while Trautwein stepped into the background after 1935.

The last four chapters follow the historical trajectory of the Trautonium until essentially the early 1960s. A child of Weimar modernity, the instrument was sup- ported by Paul Hindemith, who wrote some works for it, including the *Seven Trio Pieces for three Trautoniums* played in 1930. Under Nazism (Chap. 6), the Trautonium embodied a technology in the service of the people: "The Trautonium became an instrument of propaganda, as it embodied the virtues of Germany's musical, scientific and technological propaganda" (180). The Volkstrautonium received the support of Joseph Goebbels, charmed by its "steely romanticism".

Trautwein, a member of the Nazi party from April 1, 1933, then defended the National Socialist and Aryan character of his invention and obtained the support of the Reichskulturkammer. After the RVS was abolished in 1935, he was appointed head of the *Musik und Technik* group at the Berlin Academy of Music. Sala, although he did not join the NSDAP, emphasized the imitative aspect of the instrument, participating in numerous radio broadcasts in different registers, Hausmusik, Unterhaltungsmusik, Konzertmusik, including in 1940 the *Concerto for Trautonium* by Harald Genzmer. An improved and transportable version, the Konzerttrautonium, allowed him to travel from 1940 to the end of 1943 throughout the Greater Reich, often in conjunction with Kraft durch Freude, and in the occupied territories, including Paris in November 1943. Sala was, however, mobilized in the Wehrmacht in November 1944 and taken prisoner by the Americans in 1945.

The two protagonists took different postwar paths (Chaps. 7 and 9). Trautwein faced difficulties, holding various jobs before becoming a teacher at the Düsseldorf Conservatory in 1950. Bitter at being misunderstood, he focused on aesthetic prob- lems and clashed with Sala over patents, with the disagreements resolved in 1953. After his release, Sala took refuge in his hometown in Thuringia until 1947. He put himself in tune with the German Wirtschaftswunder (Economic Miracle), fulfilling numerous music commissions for documentary films from major companies, such as BASF, Mannesmann, Hoechst, etc. Starting in 1951, he contributed to the soundtracks of numerous German films using his Mixtur-Trautonium, an instrument richer in harmonics and especially in subharmonics than previous versions. Among the different registers of the instrument, the emphasis was then placed on the creation of new sounds. In 1958, Sala was able to open his own production studio in Berlin- Spandau. The reputation of the instrument was at its peak when Alfred Hitchcock used Sala to produce part of the soundtrack for his film *The Birds* in 1962. Sala continued his career until the early 1990s, having incorporated magnetic tape into the playing of the instrument in the 1950s.

The eighth chapter is devoted to the analysis of the differences in conception of what is now called electro-acoustic music, between Sala and Trautwein on the one hand, and the main actors of the Cologne Studio for electronic music attached to the NWDR (Nordwestdeutscher Rundfunk), like Werner Meyer-Eppler and Karlheinz Stockhausen, or the French Group of *musique concrète* founded by Pierre Schaeffer, on the other. Sala and Trautwein criticized the Cologne Studio for the poverty of their sound and the inhumanity of their practice of additive synthesis from sinusoidal vibrations recorded on magnetic tape, contesting the compositional nature of works cobbled together by cutting and pasting pieces of tape. They campaigned in favour of maintaining a human presence in concert broadcasting. They are therefore early

proponents of what we now call mixed works, mixing pre-recorded music and real- time performance.

Although the plan of the work is clear, certain passages, particularly technical ones, are difficult to read for non-specialists. Criticism of sources sometimes appears insufficient: the reporting of gaps in the available documentation is not mentioned, unlike in Brilmeyer (2017). If the local ecosystem and the multiplicity of actors is very well understood and very pertinently placed in its historical context, there is a lack of consideration of the global organological ecosystem, as proposed by De Wilde (2019). Subtractive synthesis and envelope generation were experimented in the United States almost at the same time, but Hammond's Novachord is just mentioned in the introduction (6). We would have liked to know more about Trautwein and Sala's conceptualization and realization of the sound envelope, which in the cur- rent computer age is the basis of all musical synthesis.

Overall, this is a beautiful academic study on the genesis and life of a complex technical object, well located in the interweaving of its scientific, technical, social, cultural and political contexts and attentive to the play of its various actors.

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